



APPLN. NO.: 09/699,873
TITLE: MICROFABRICATED
CHEMICAL REACTOR

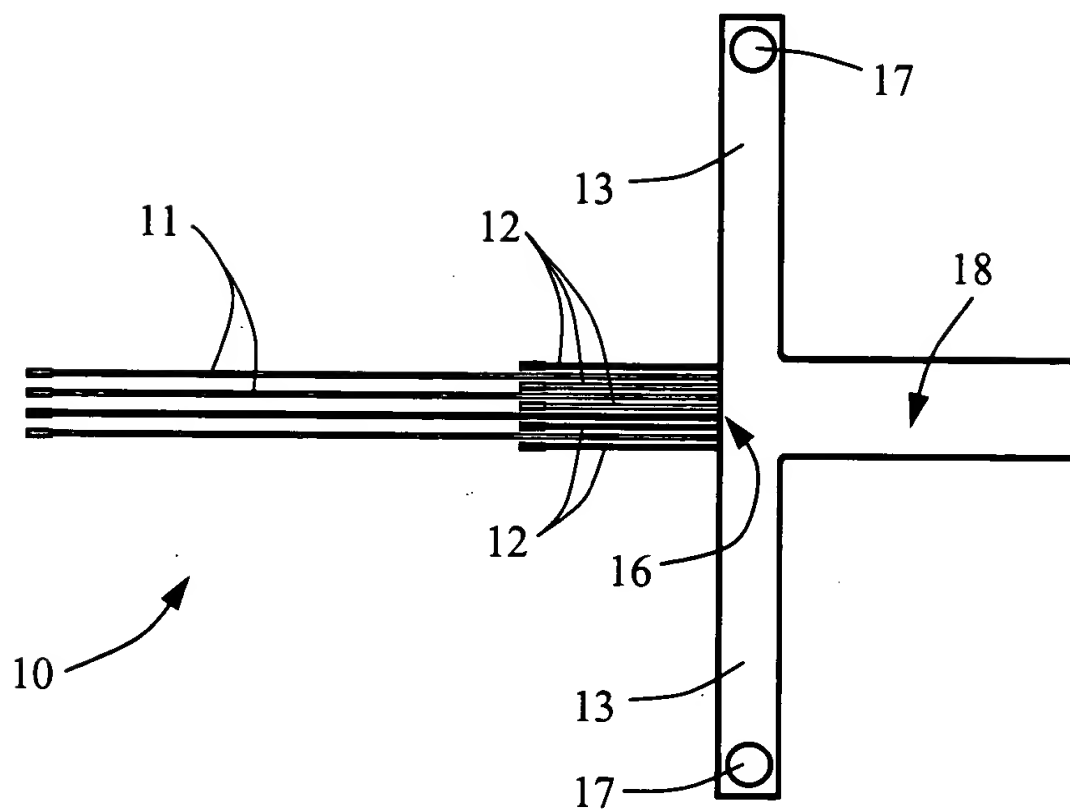


FIGURE 1

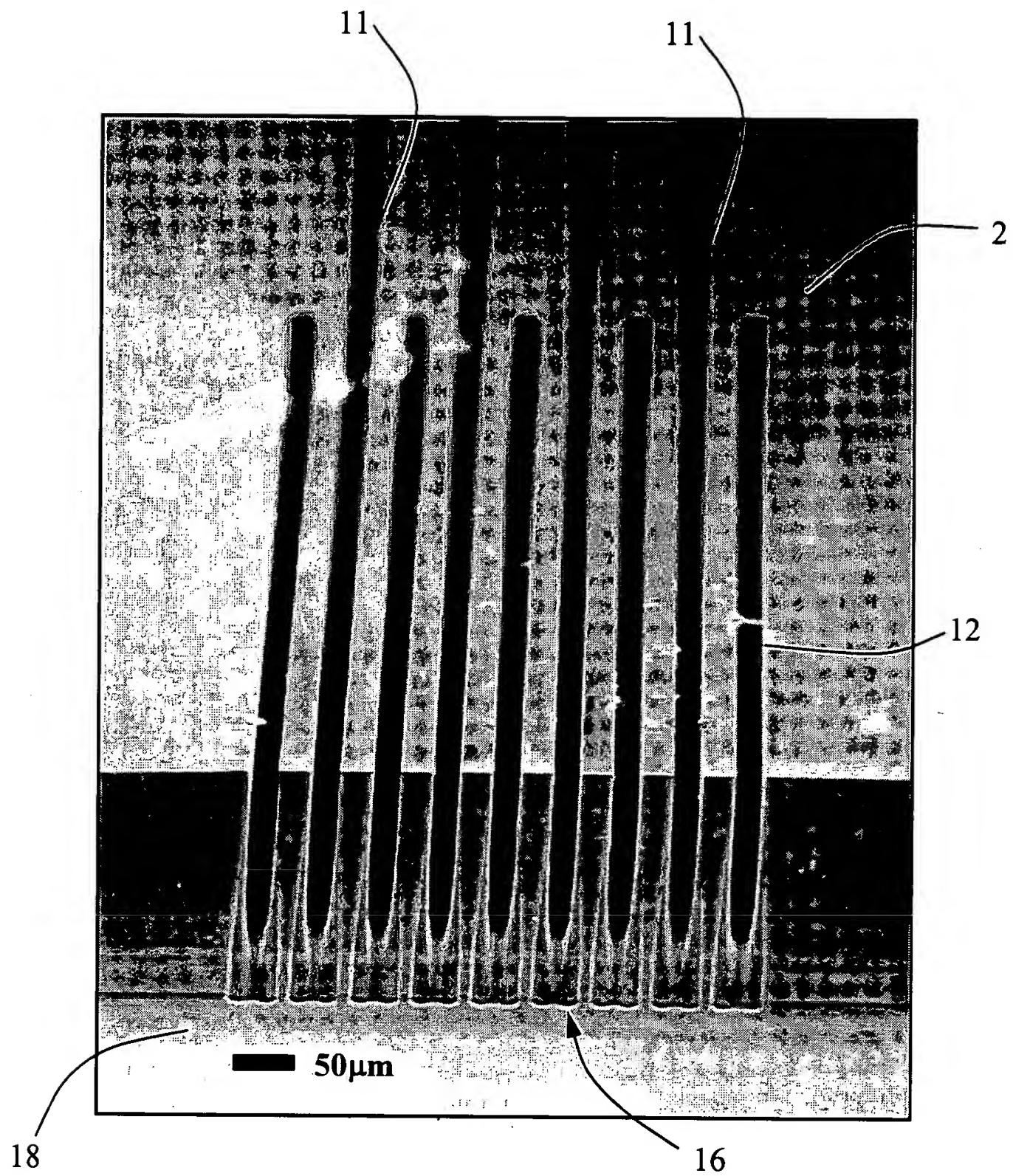


FIGURE 2

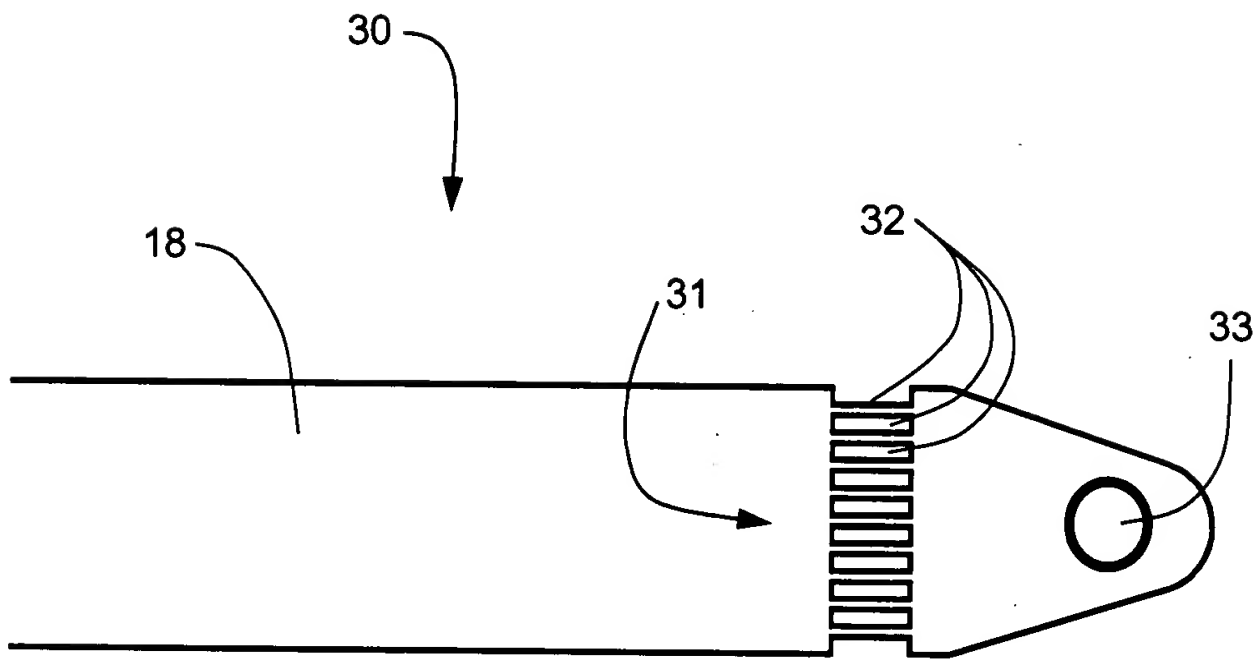


FIGURE 3

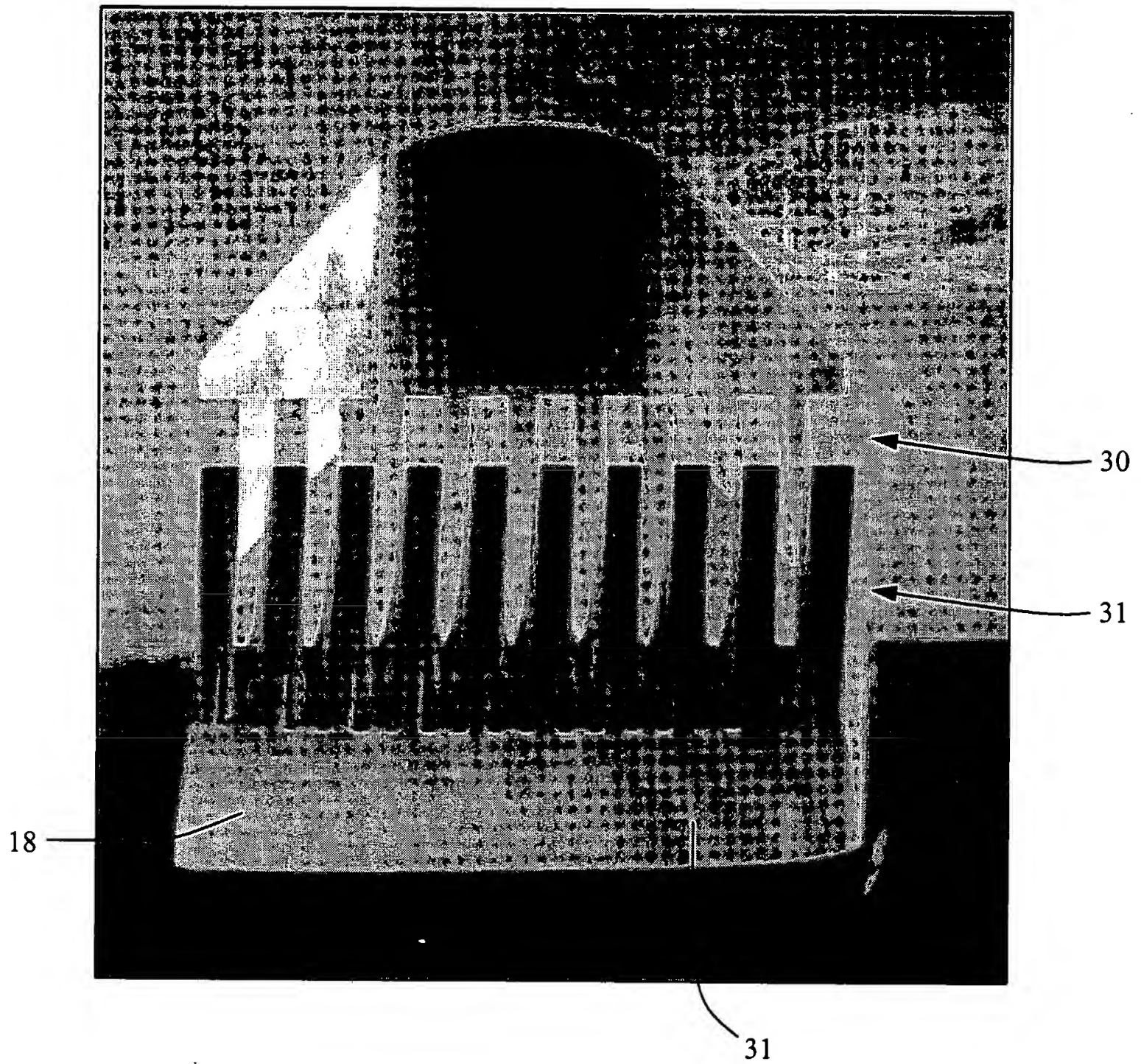


FIGURE 4

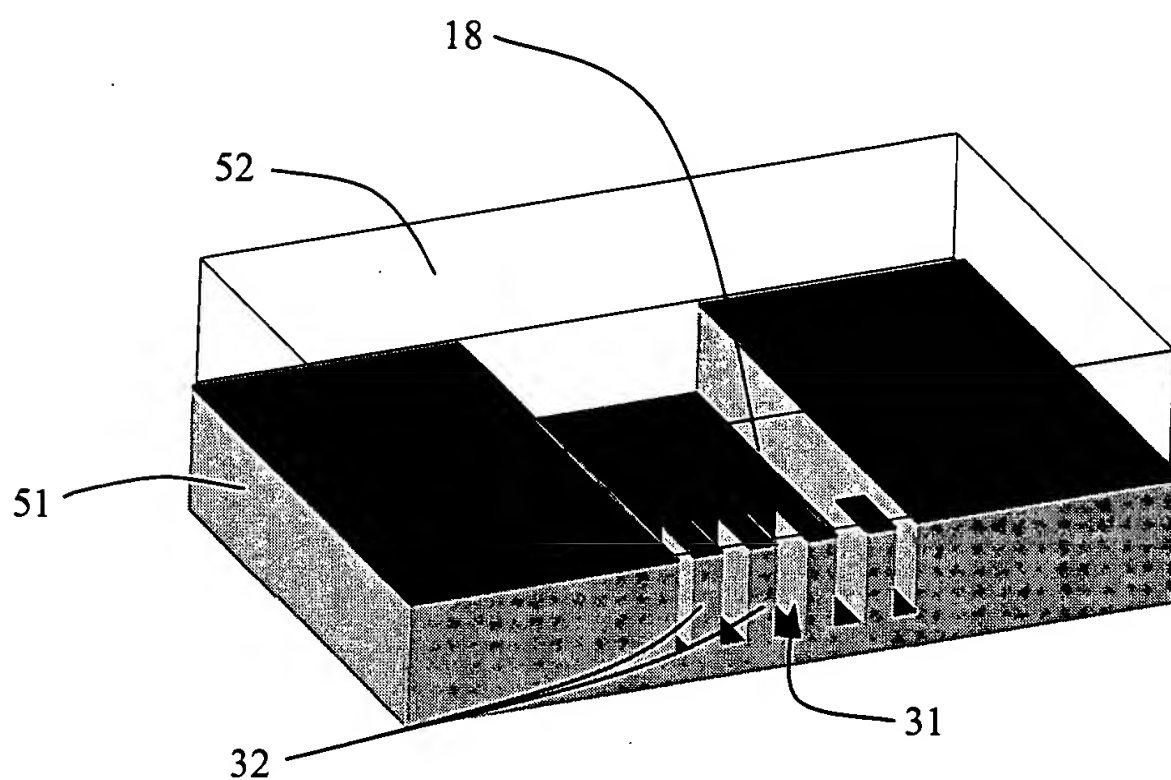


FIGURE 5

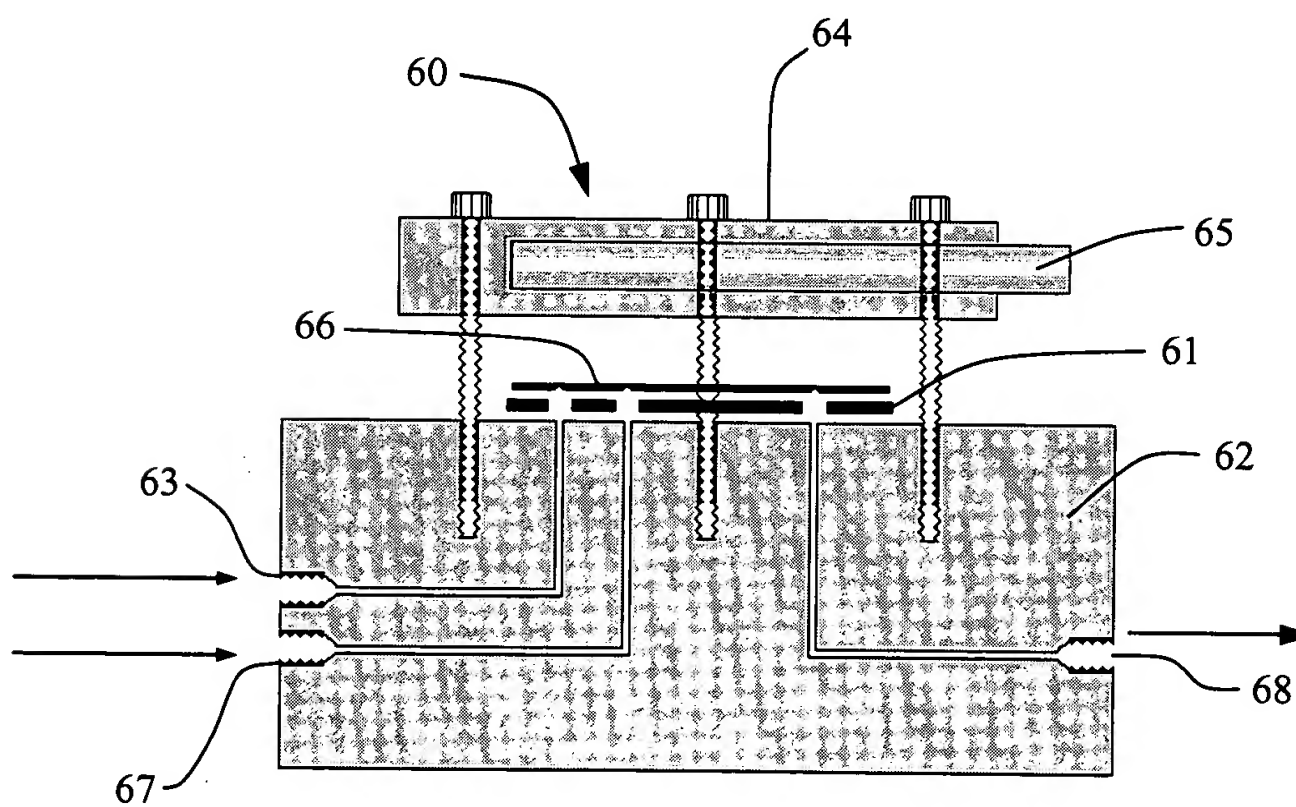


FIGURE 6

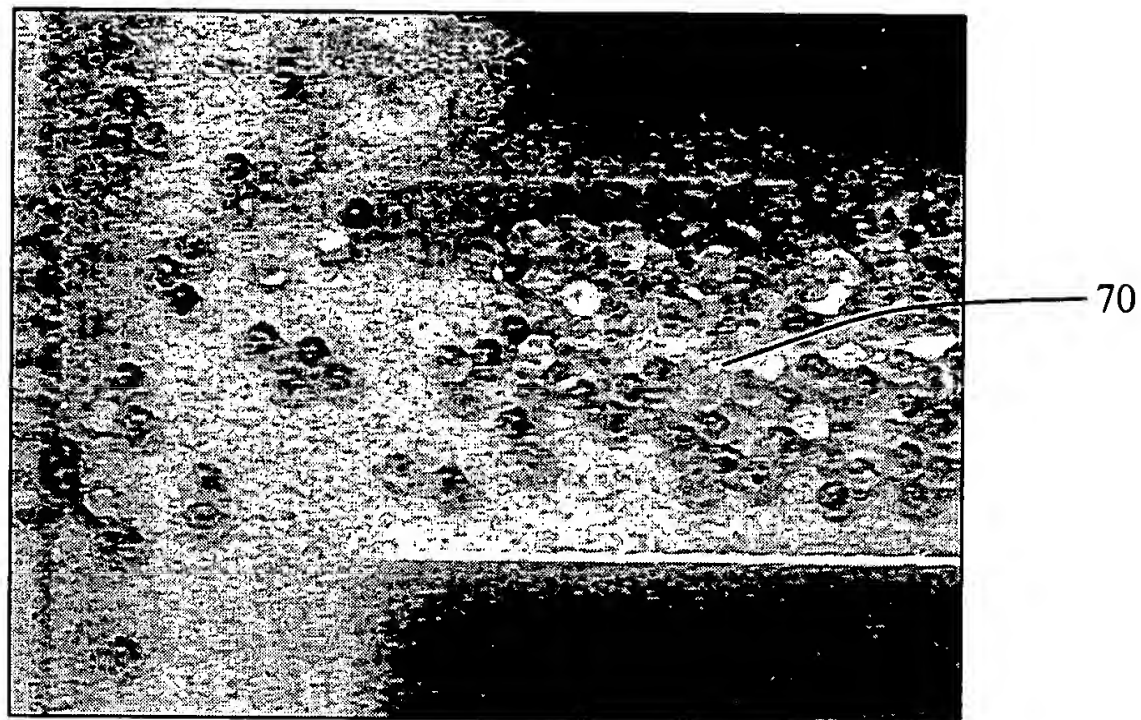


FIGURE 7a

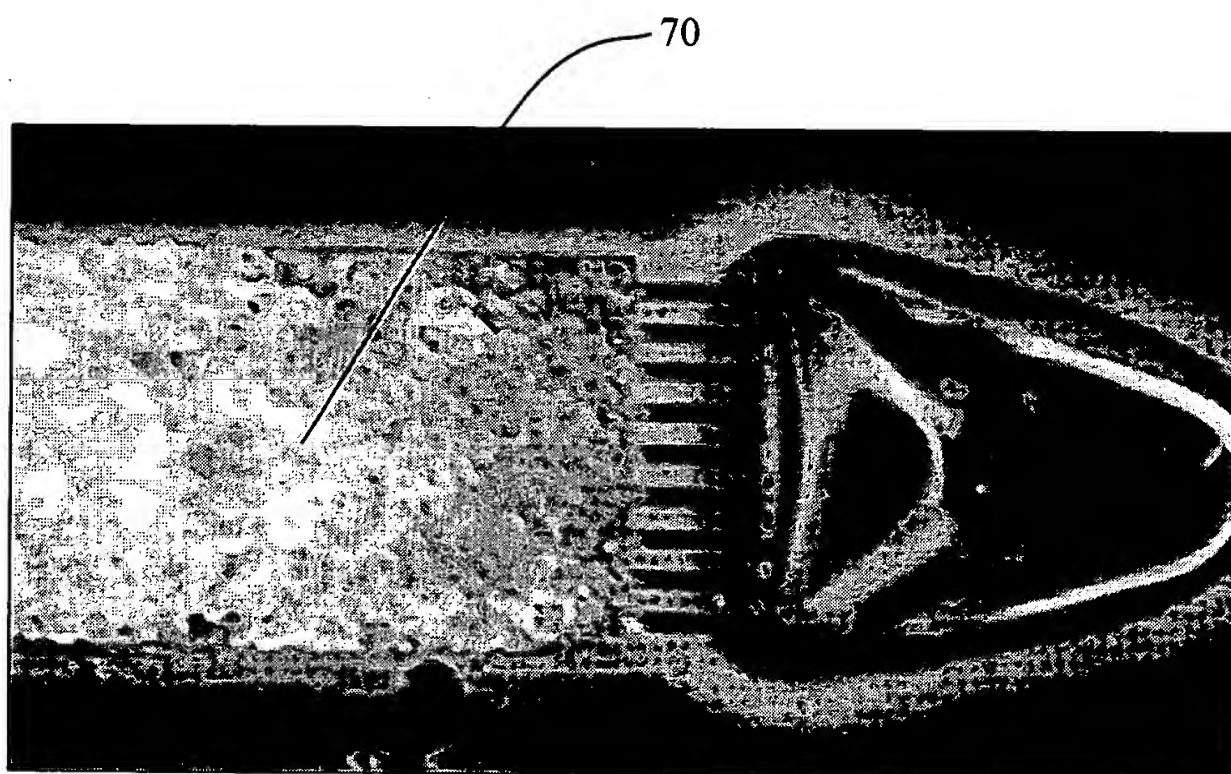


FIGURE 7b

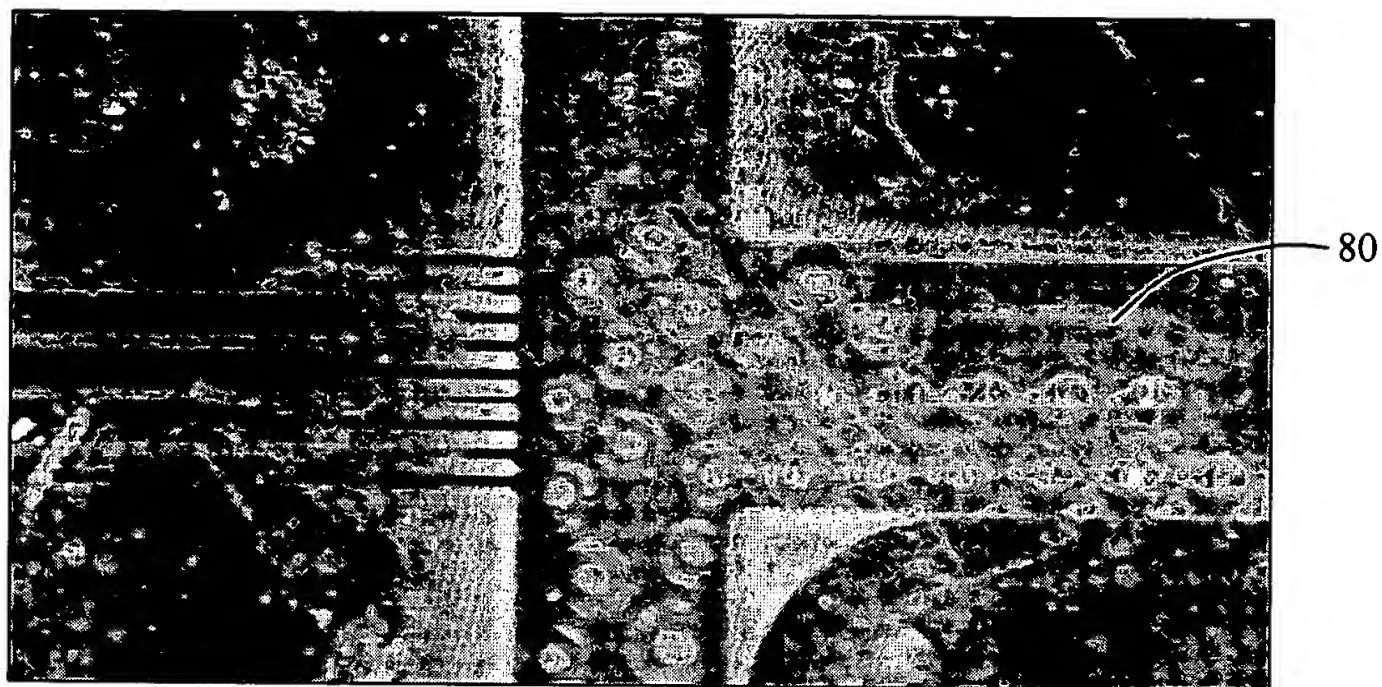


FIGURE 8

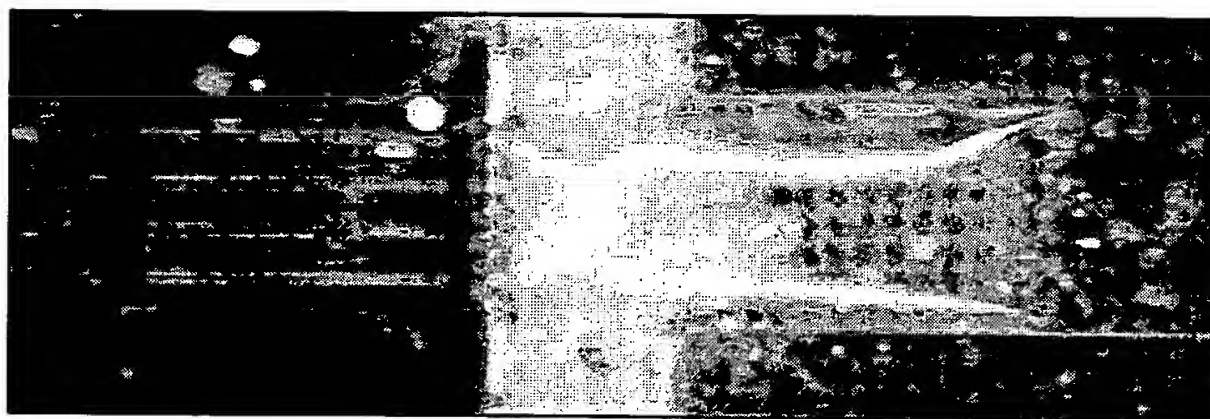


FIGURE 9

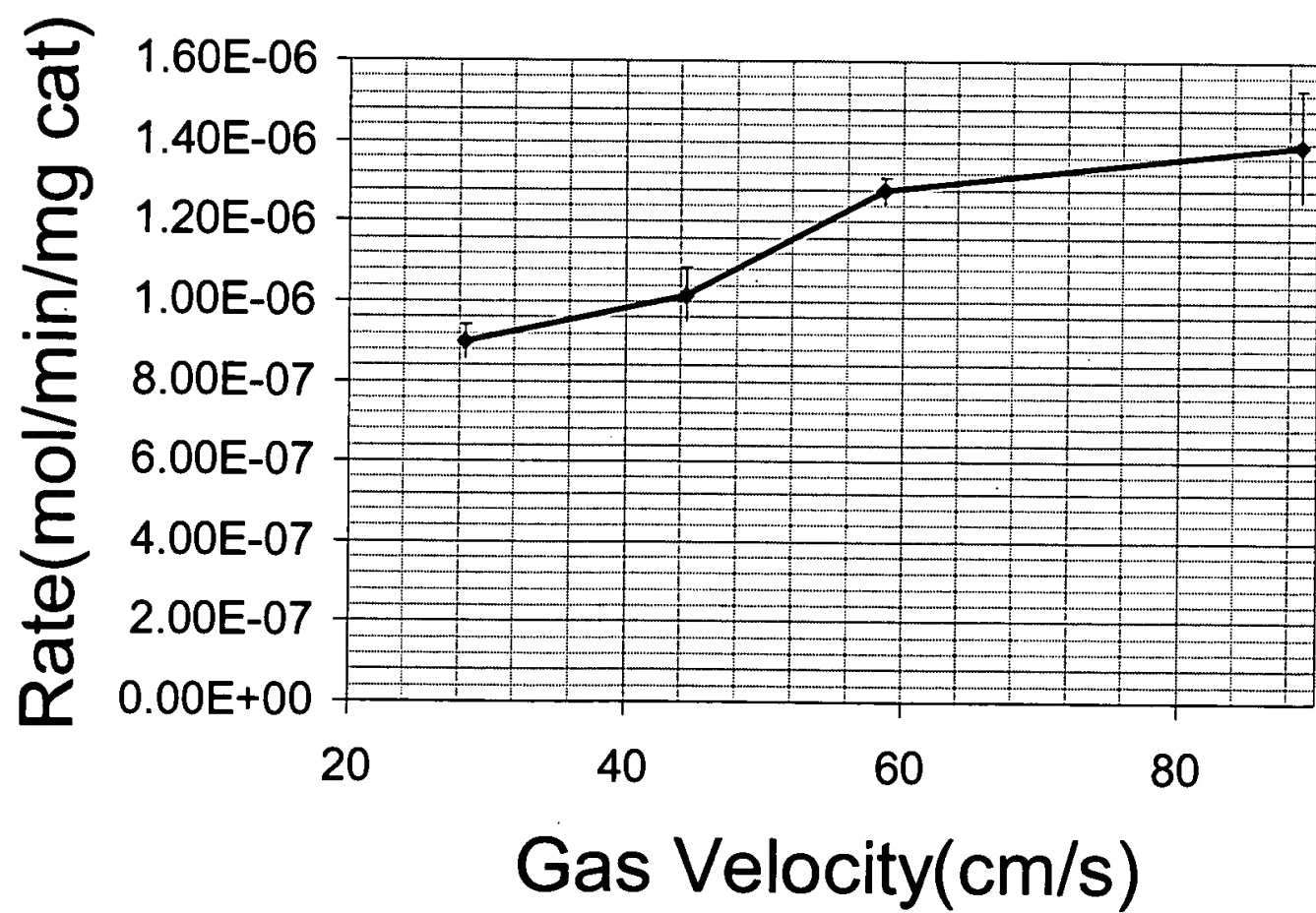
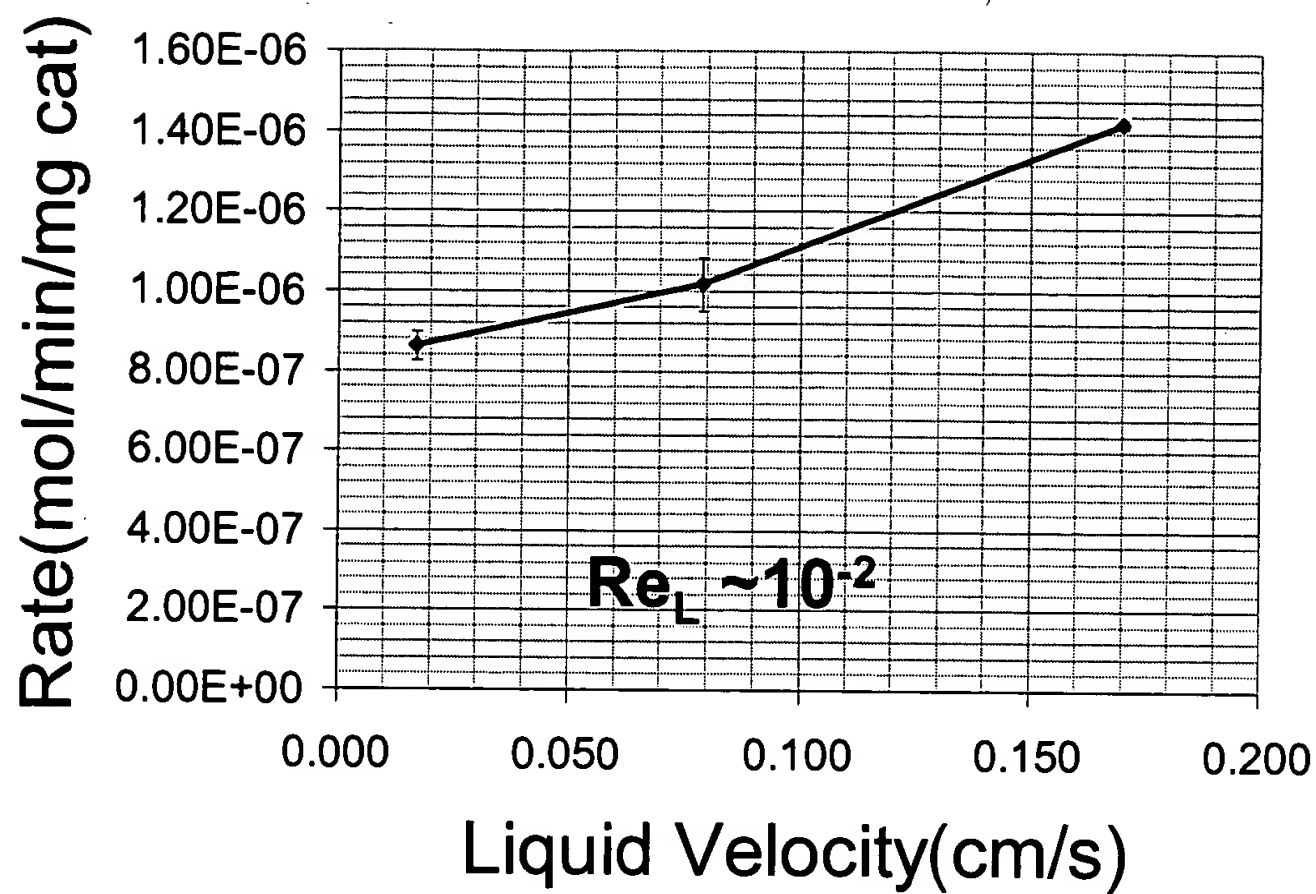


FIGURE 10a

$$k_L a = 0.45 * \frac{D_{AL}}{d_p^2} [Re_L^{4/5} \cdot We_L^{1/5} \cdot Sc_L^{1/2} \cdot X_G^{1/2} \cdot \alpha]^{1.3}$$

FIGURE 10b

$$k_L a = 0.12 \cdot E_I^{1/2}$$

$$E_I^{1/2} = \frac{\Delta P}{\Delta L} \cdot v_L$$

FIGURE 10c

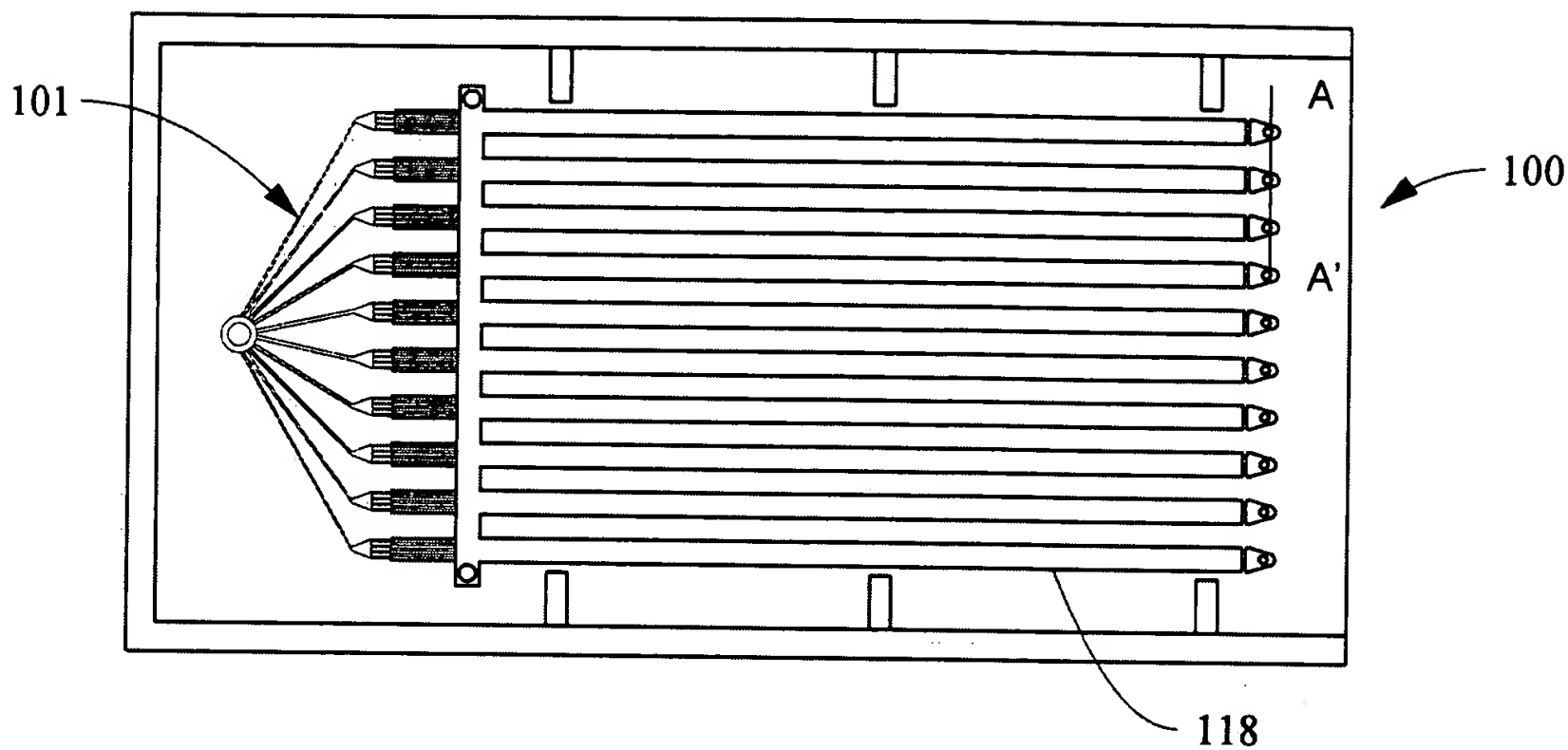


FIGURE 11a

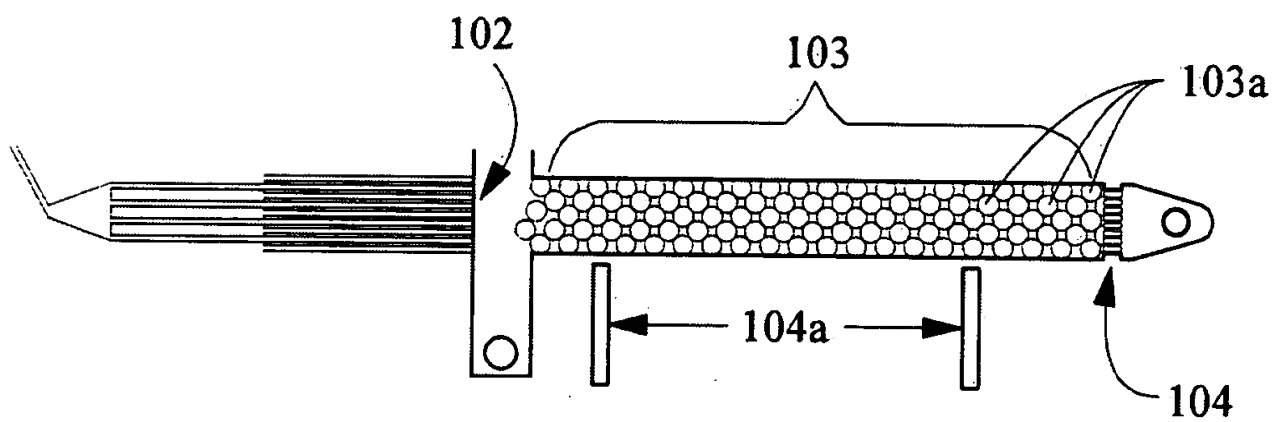


FIGURE 11b

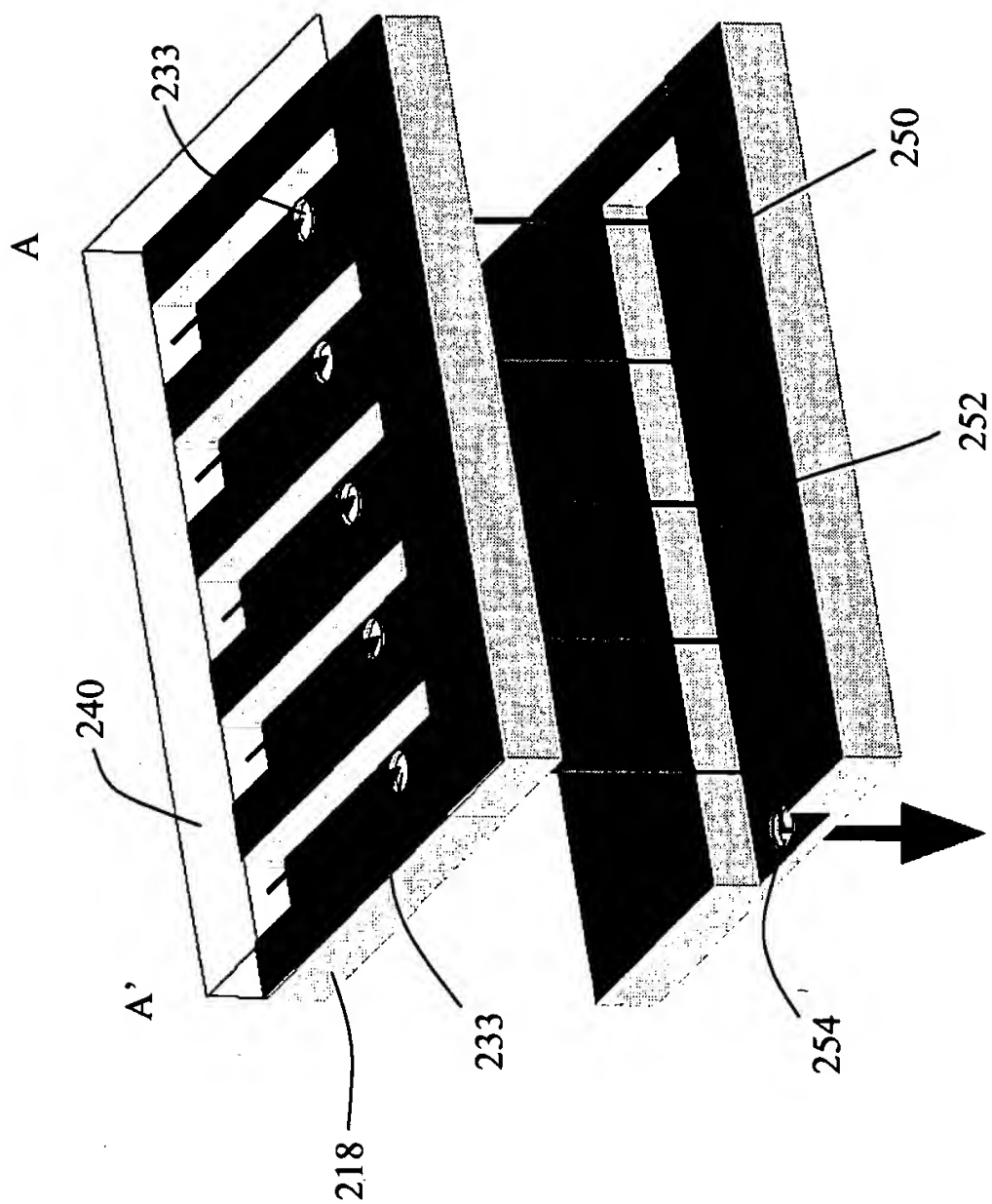


FIGURE 11C

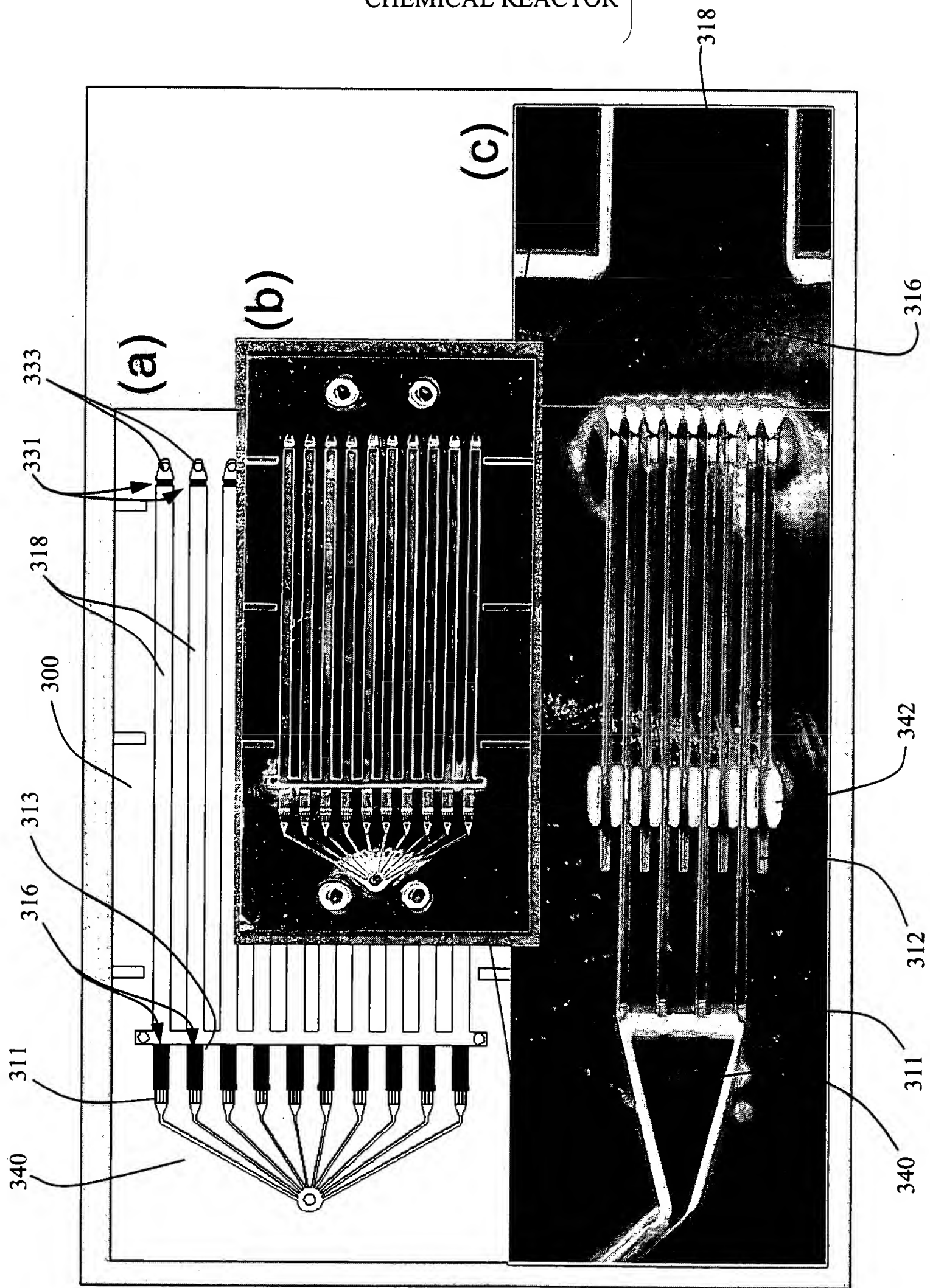


FIGURE 12

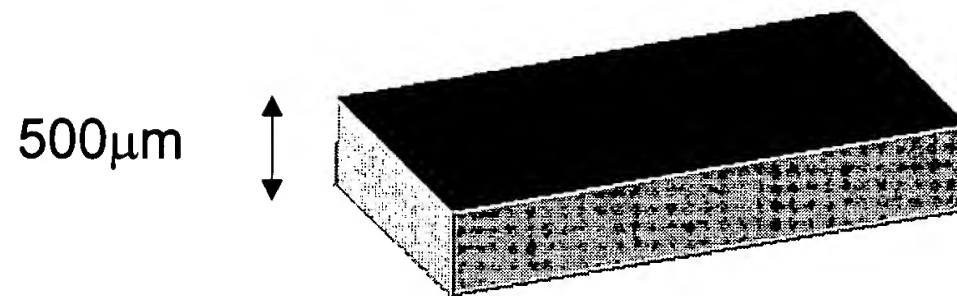


FIGURE 13a

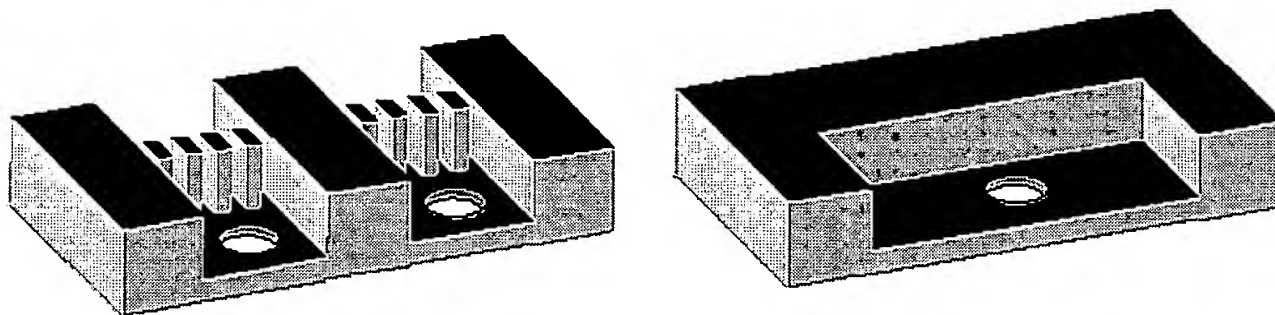


FIGURE 13b

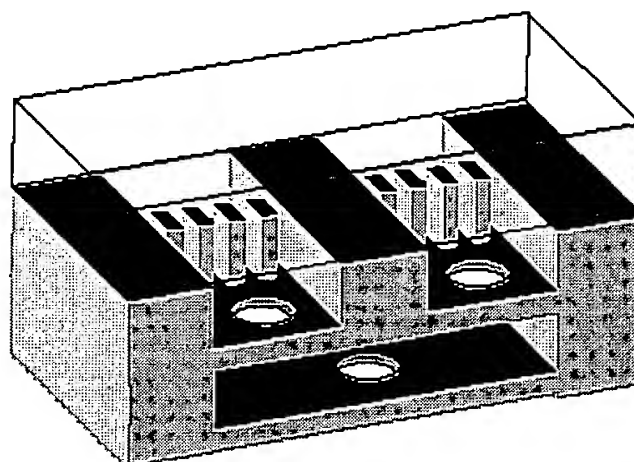


FIGURE 13c

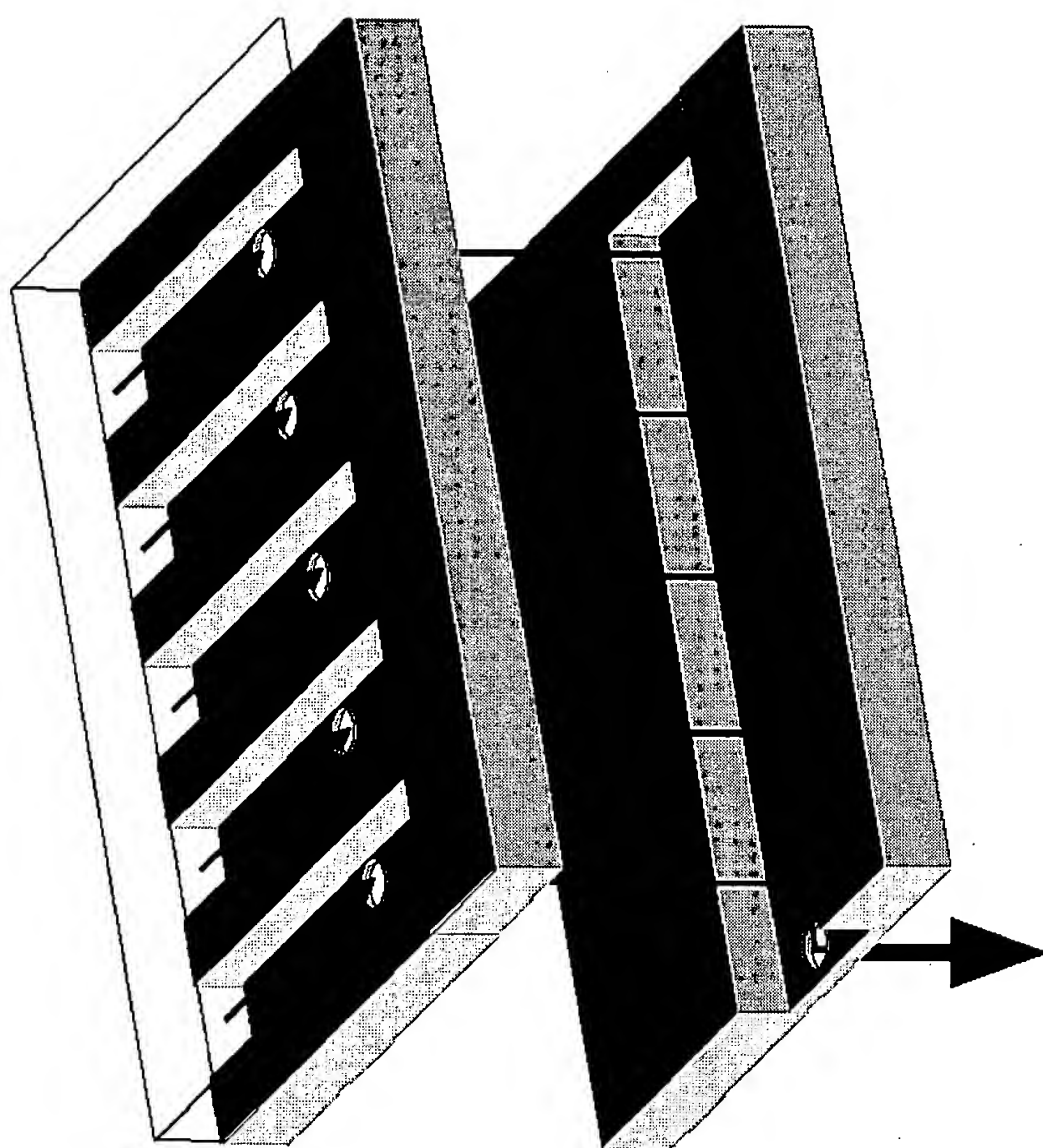
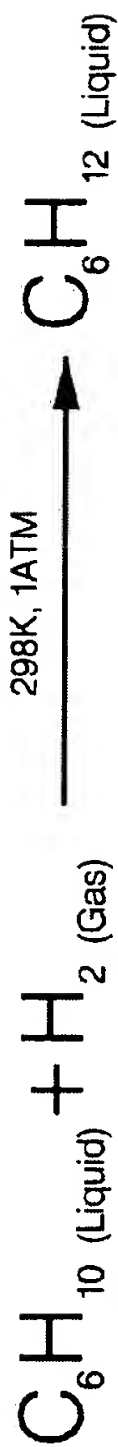
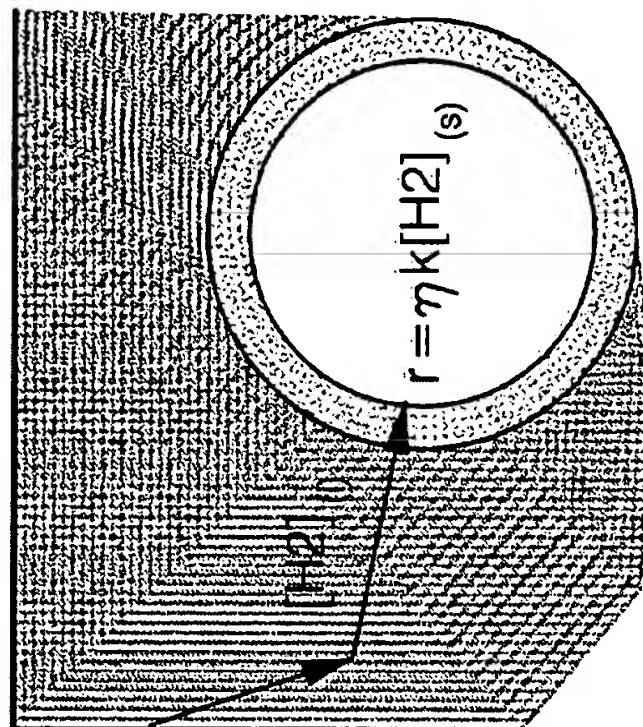


FIGURE 13d

Cyclohexene Hydrogenation



Catalyst: 5wt%Pt/Al₂O₃ or
 5wt%Pd/C, 50μm particles



Gas-Liquid Interface,

$$P_{\text{H}_2} \text{ (gas)} = H^*[\text{H}_2]_{(i)}$$

Gas-Liquid Mass Transfer,

$$r = k_1 a_1 ([\text{H}_2]_{(i)} - [\text{H}_2]_{\text{(liquid)}})$$

Liquid-Solid Mass Transfer,

$$r = k_s a_1 ([\text{H}_2]_{\text{(liquid)}} - [\text{H}_2]_{\text{(particle)}})$$

FIGURE 14

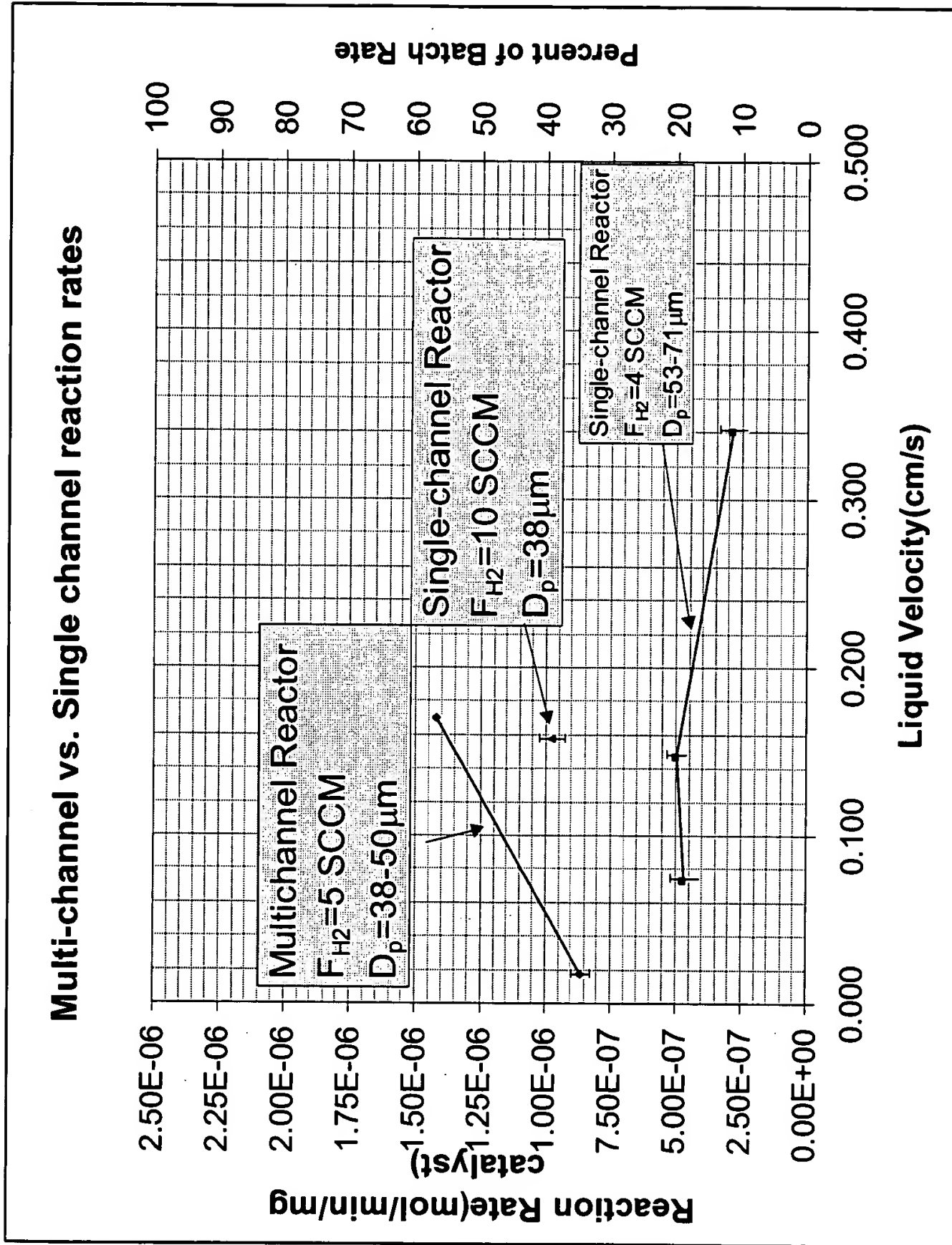


FIGURE 15

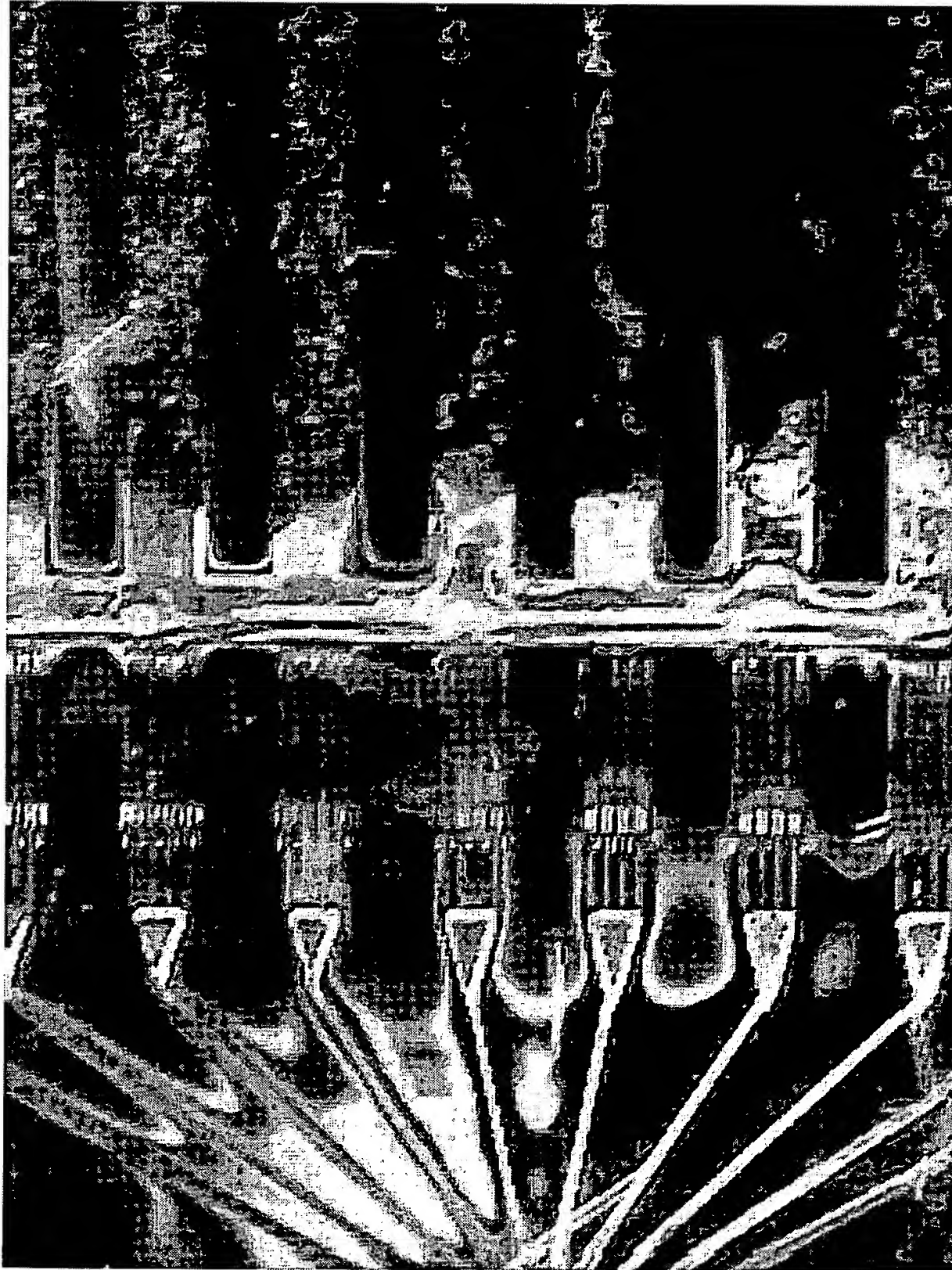


FIGURE 16a



FIGURE 16b

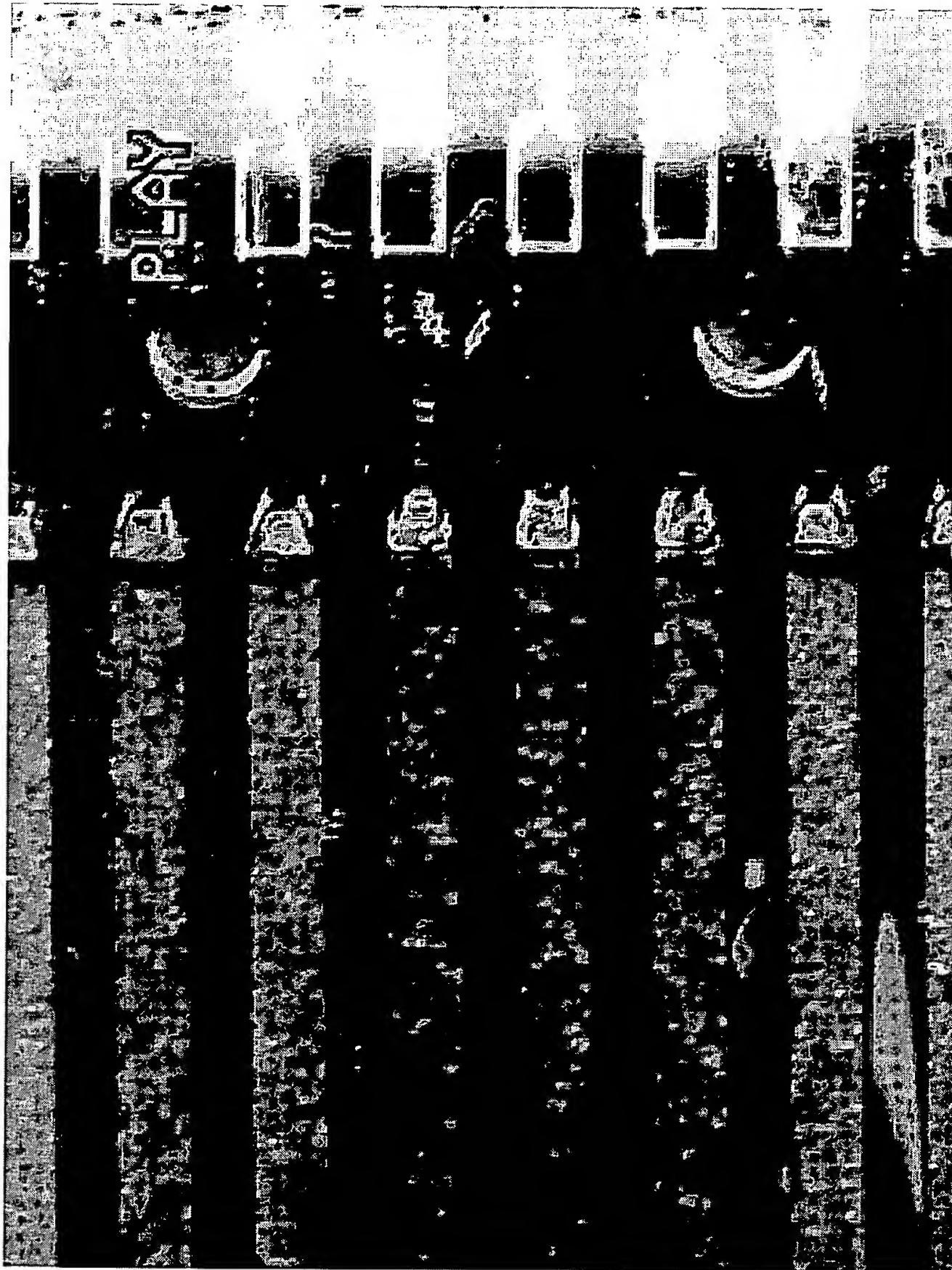


FIGURE 16C

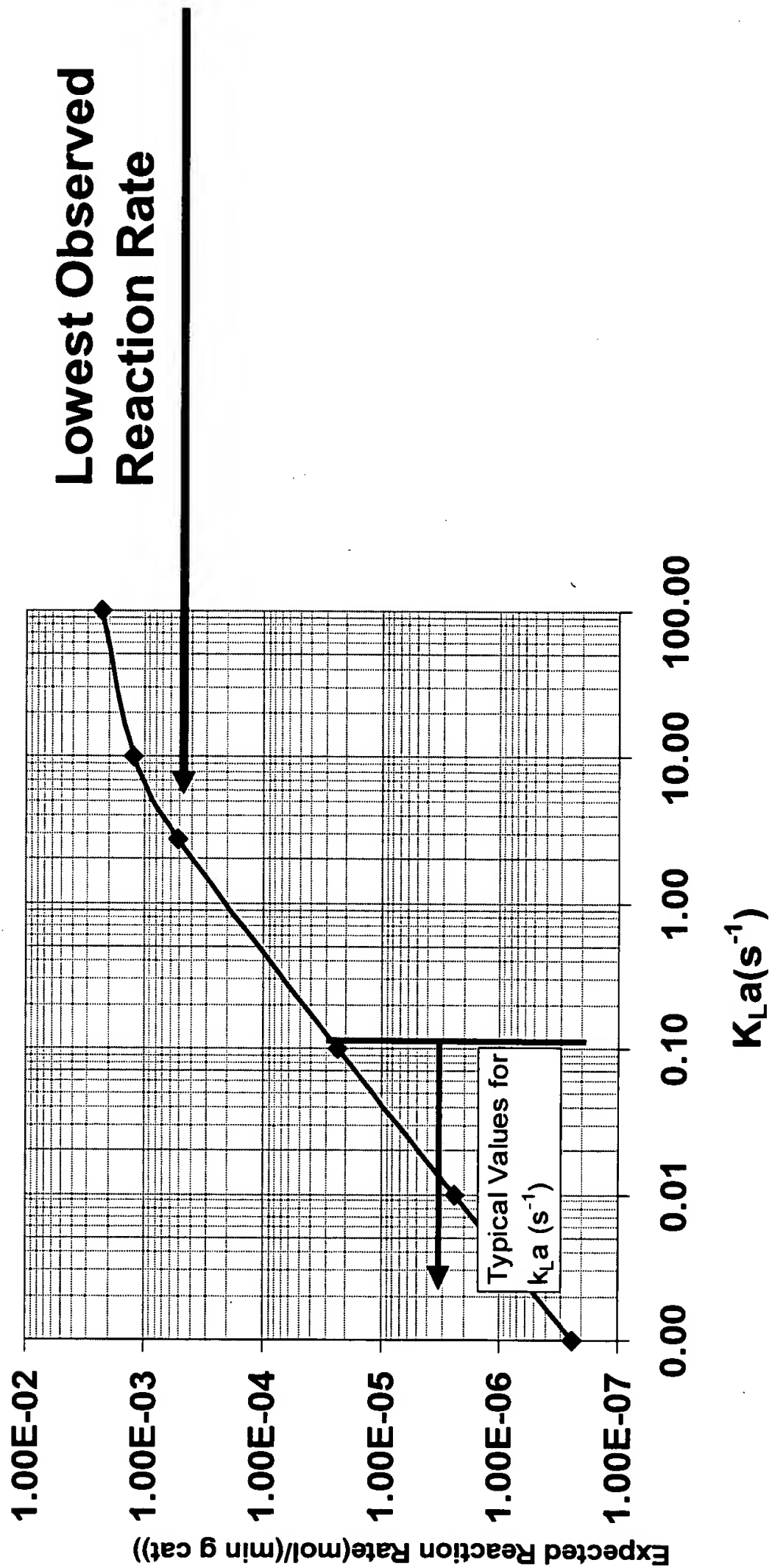


FIGURE 17

$$\frac{\Delta P}{L} \propto \frac{\mu \cdot Q}{D_p^2 \cdot A_s} \cdot \frac{(1 - \varepsilon)^2}{\varepsilon^3}$$

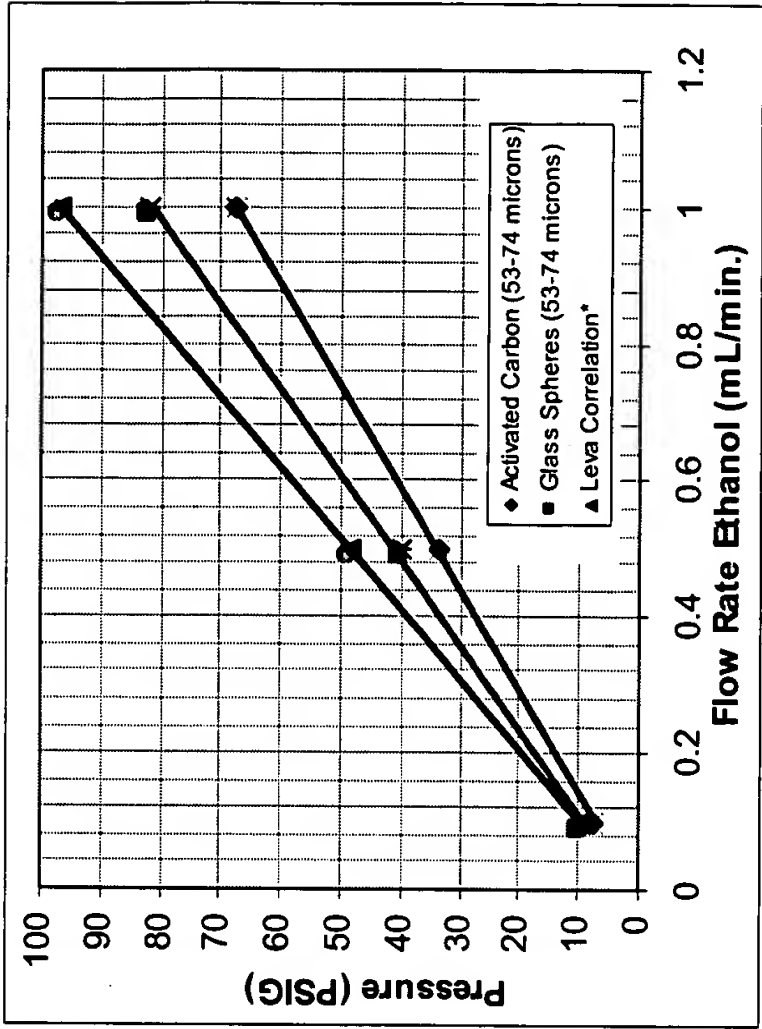
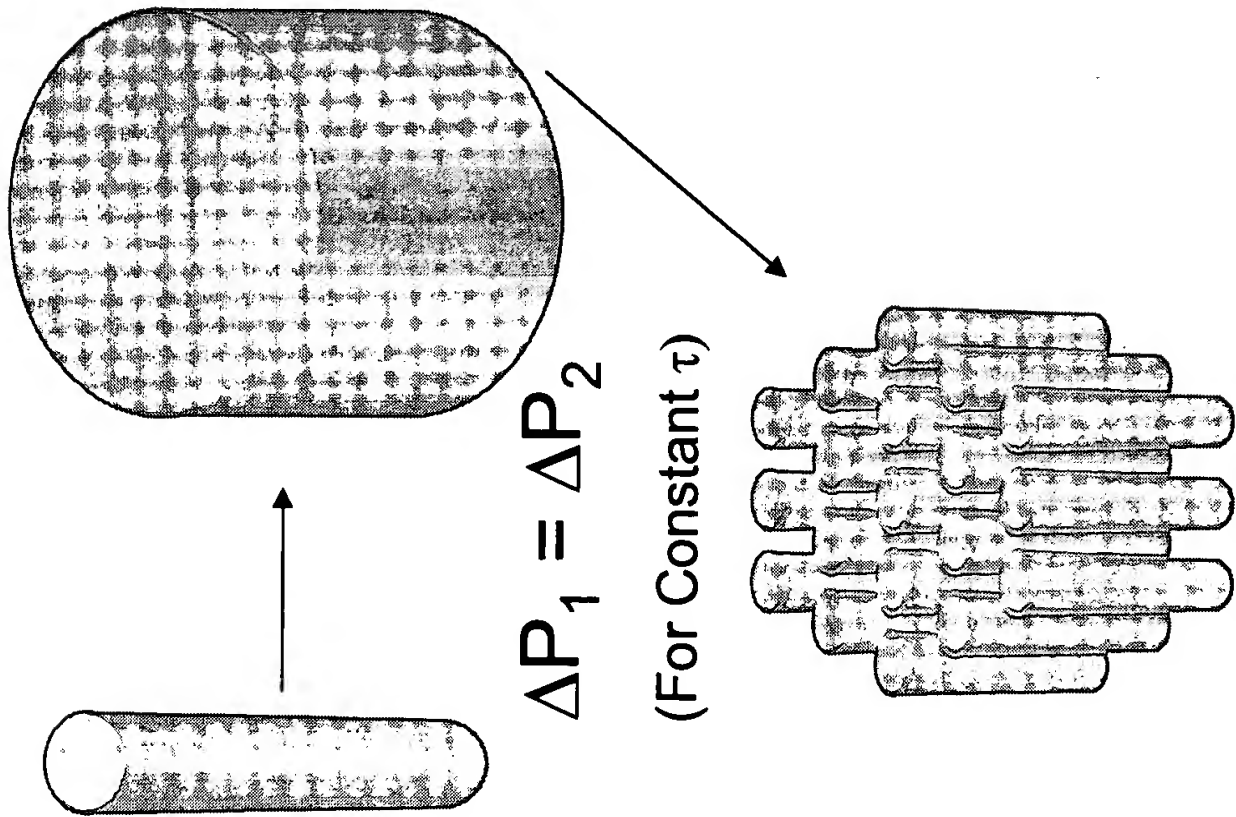


FIGURE 18

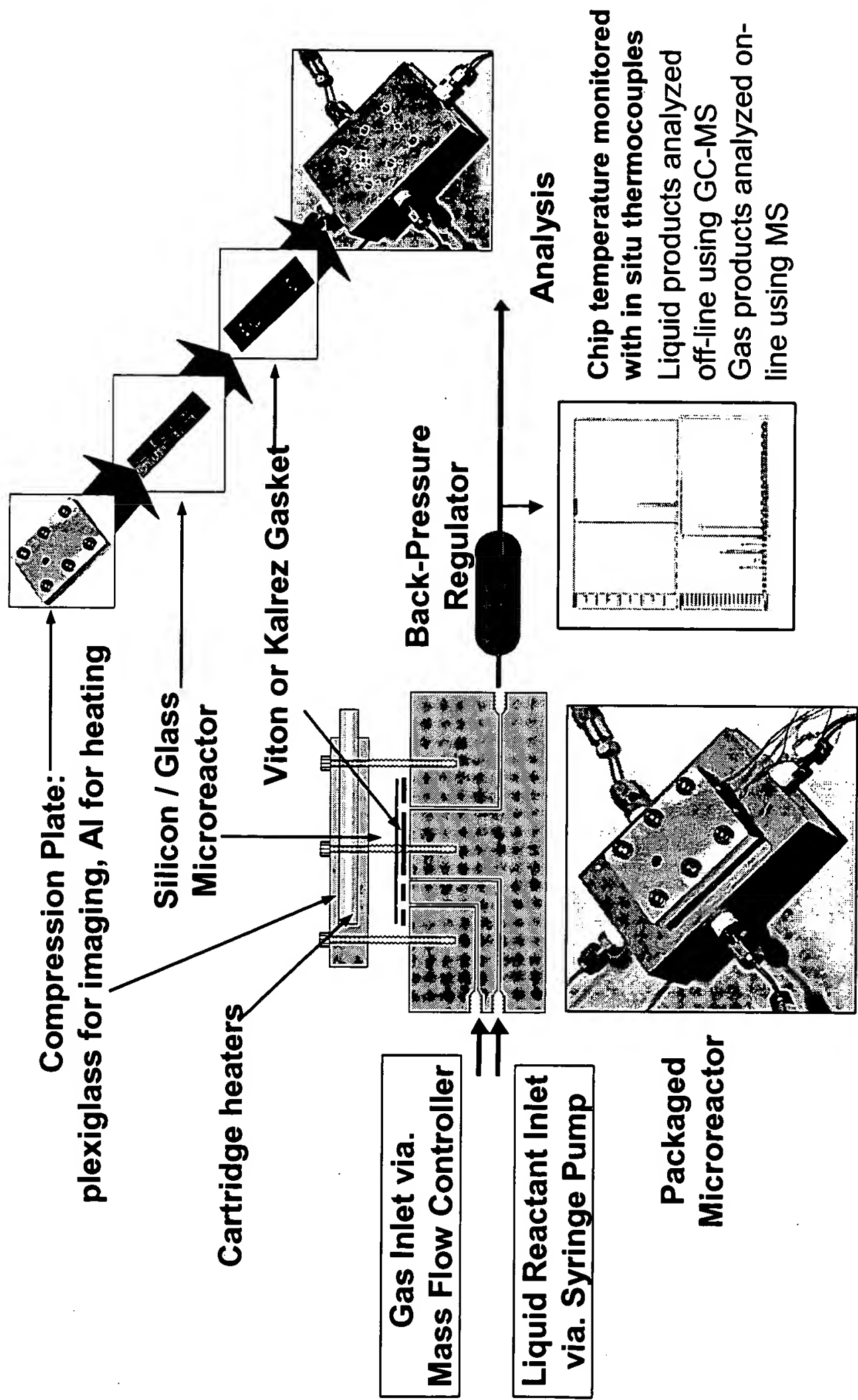


FIGURE 19

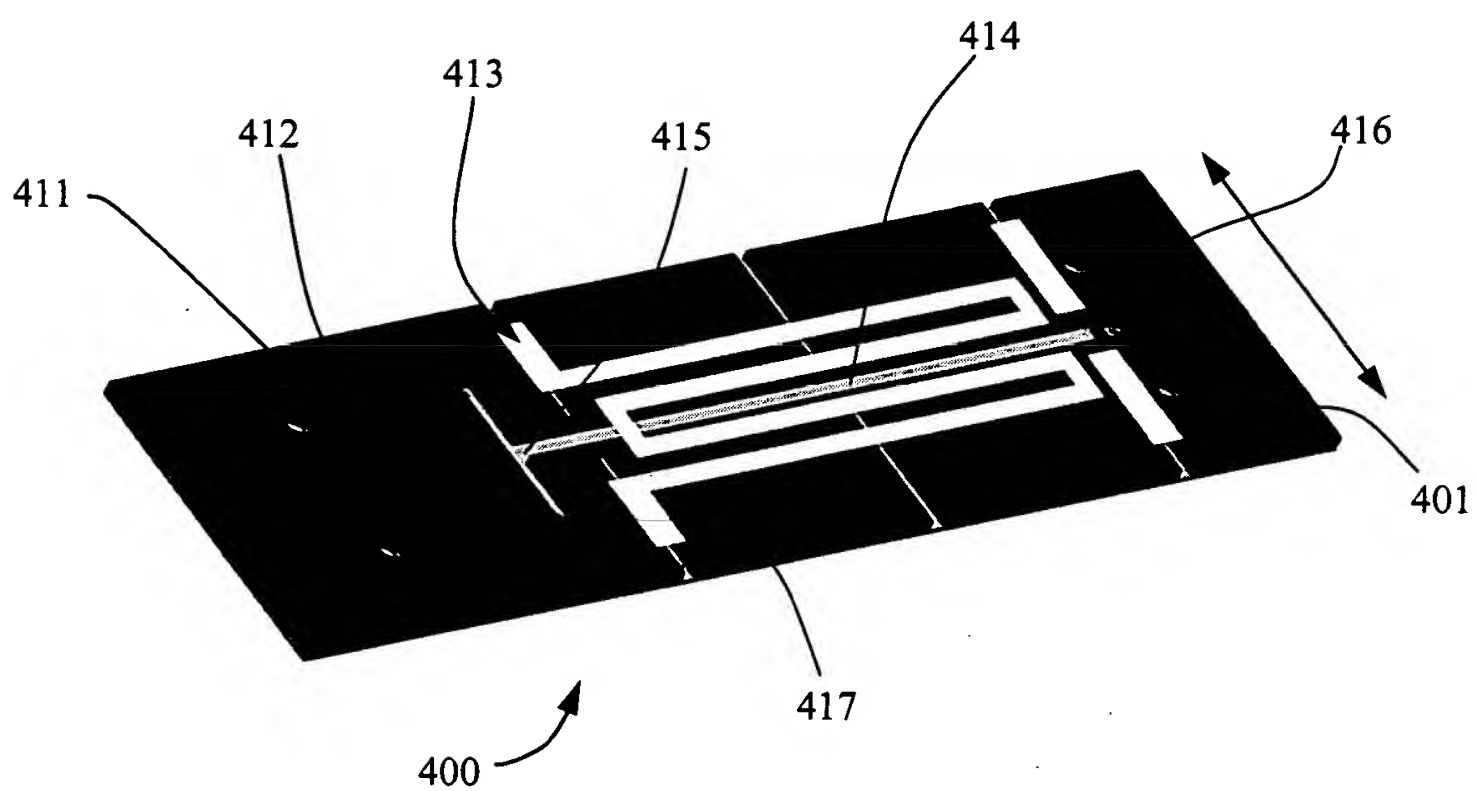


FIGURE 20

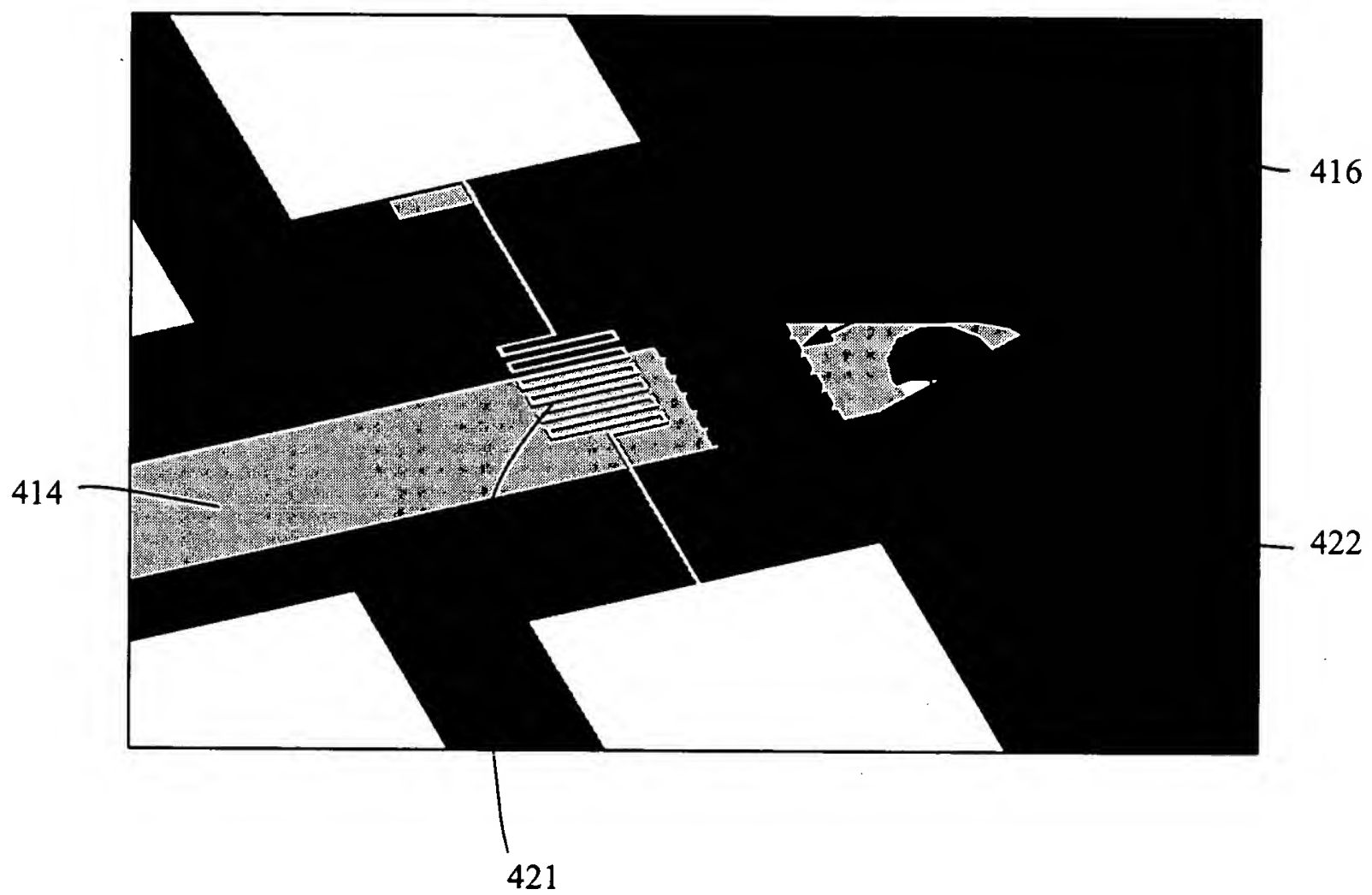


FIGURE 21

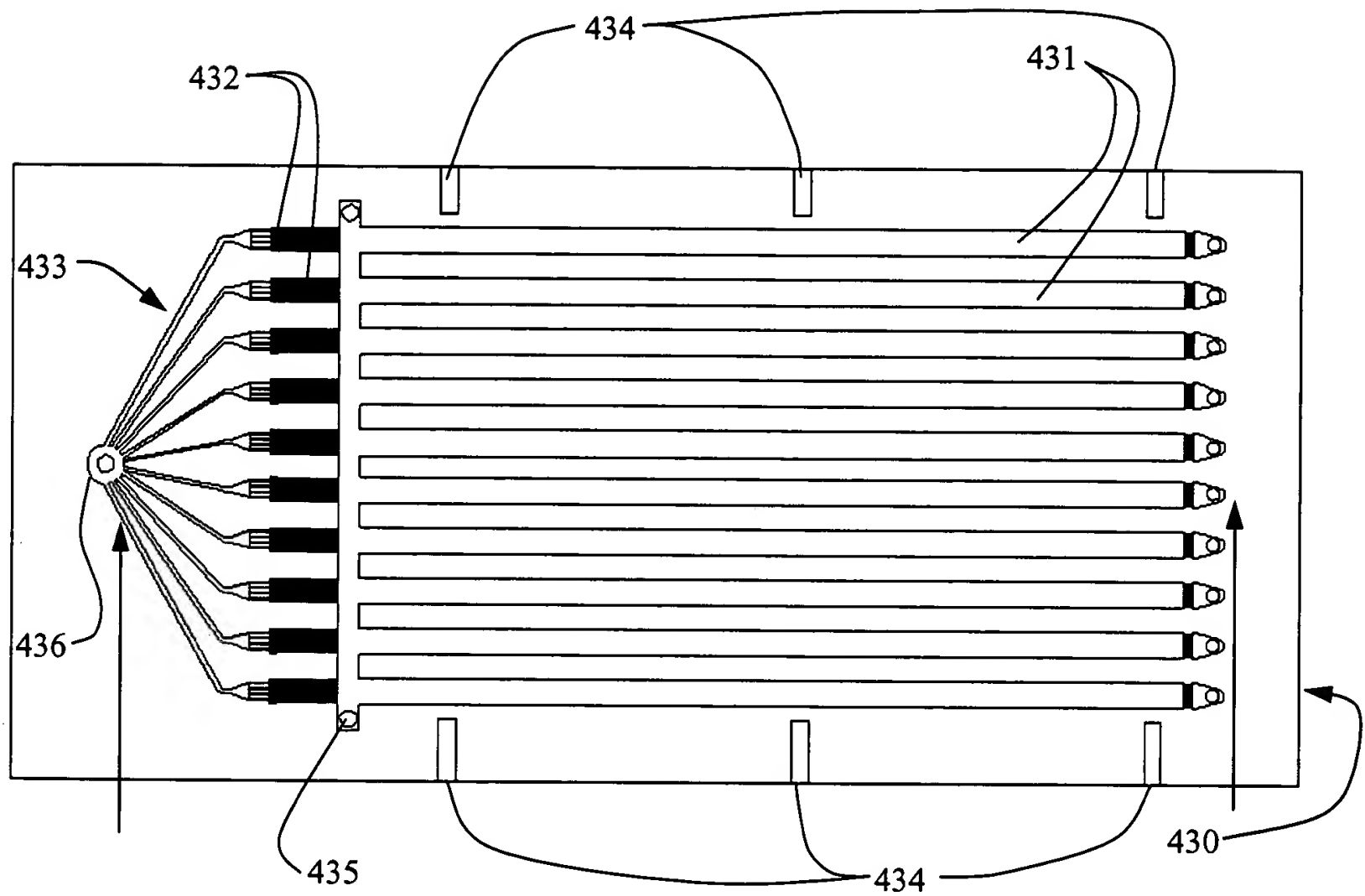


FIGURE 22

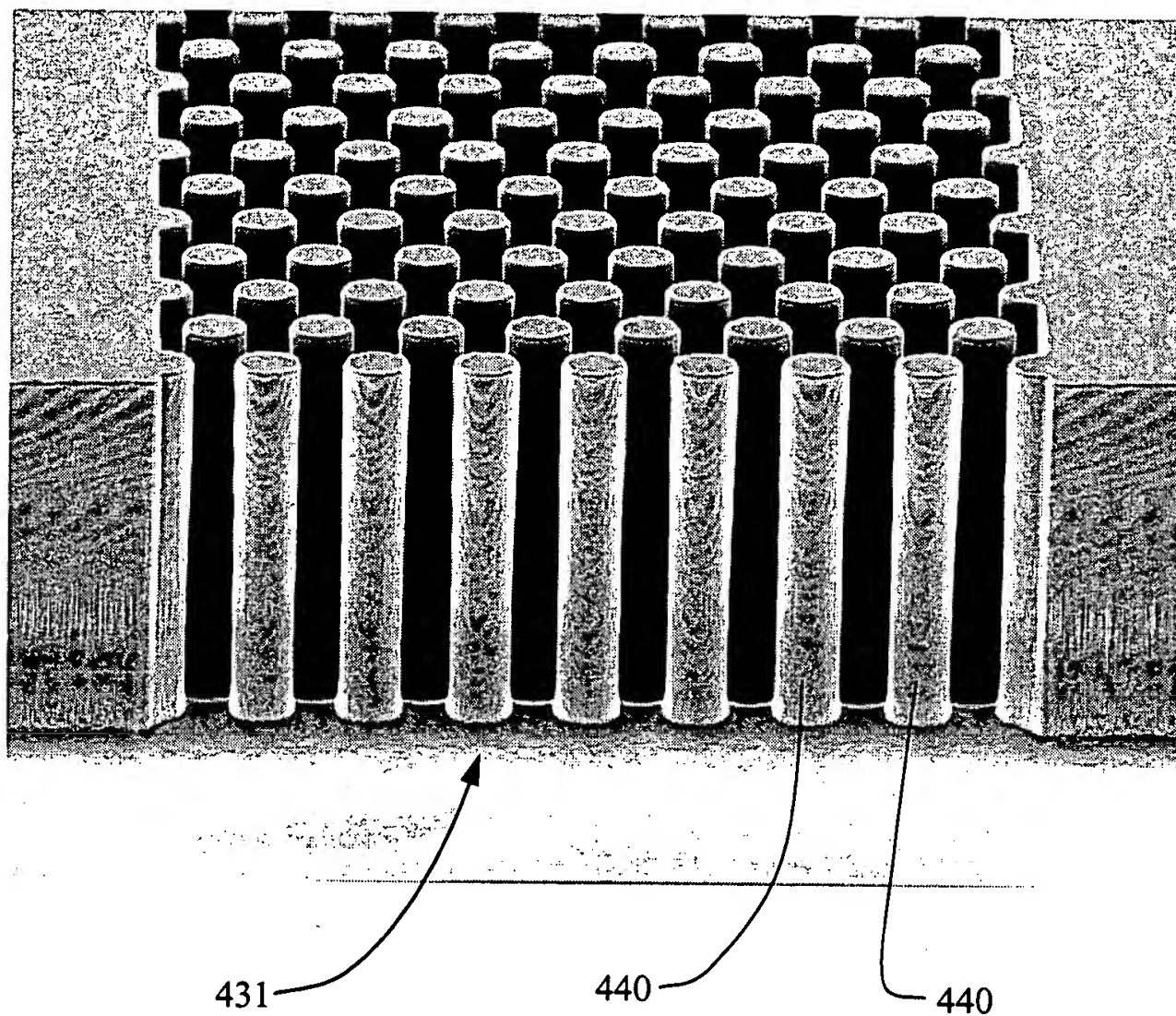


FIGURE 23

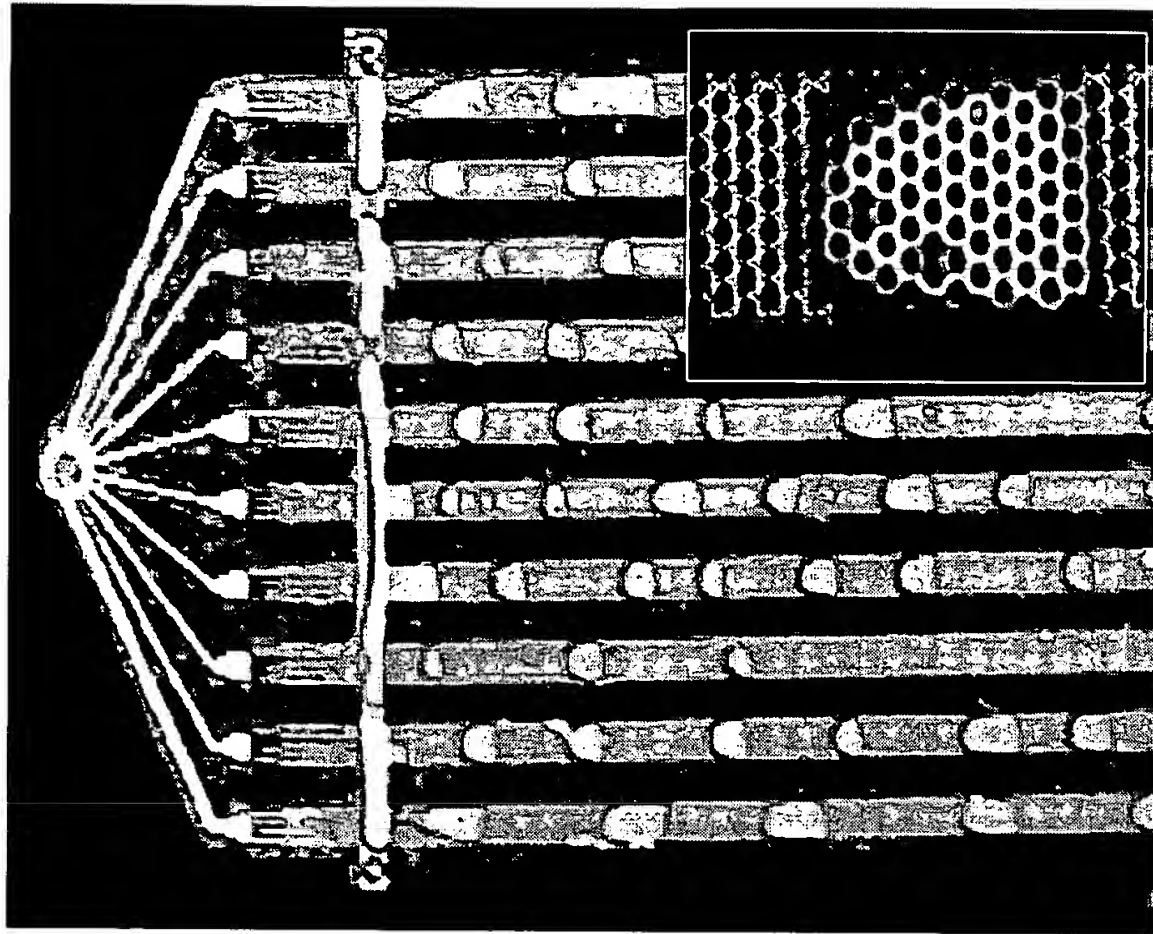


FIGURE 24a

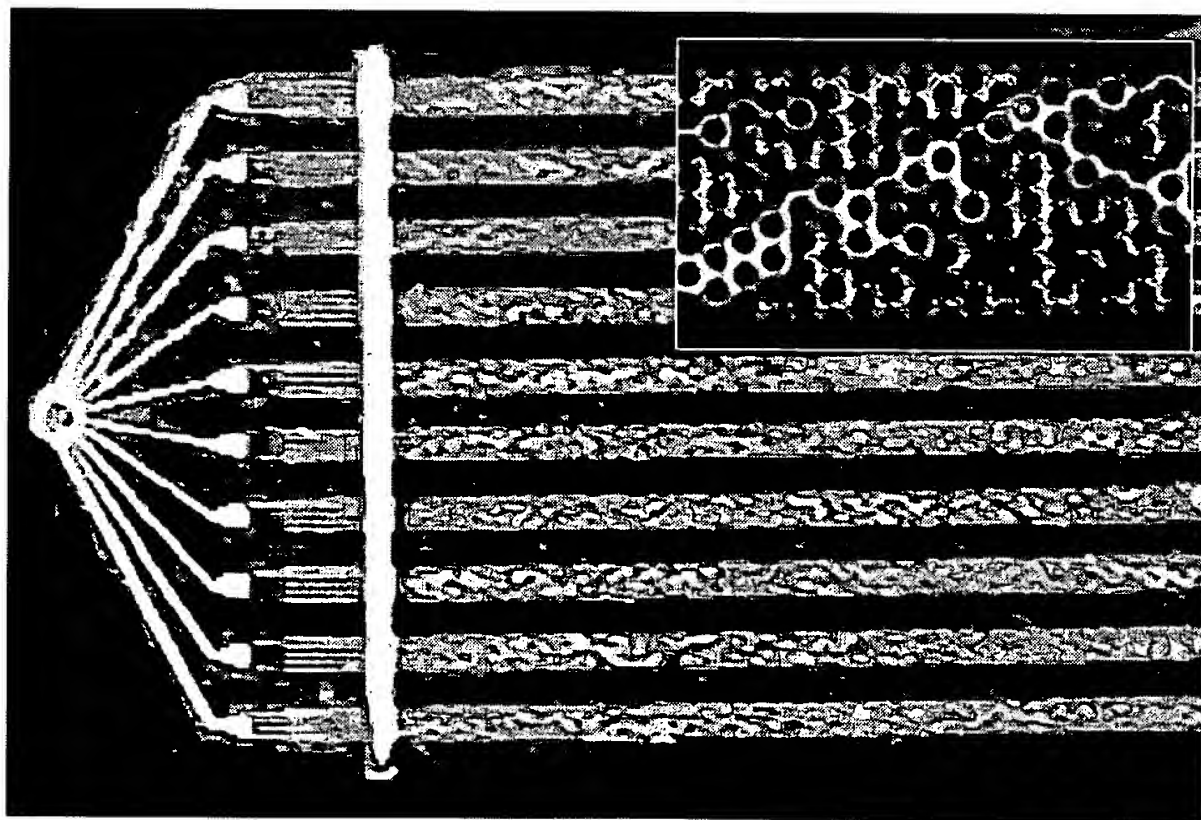


FIGURE 24b

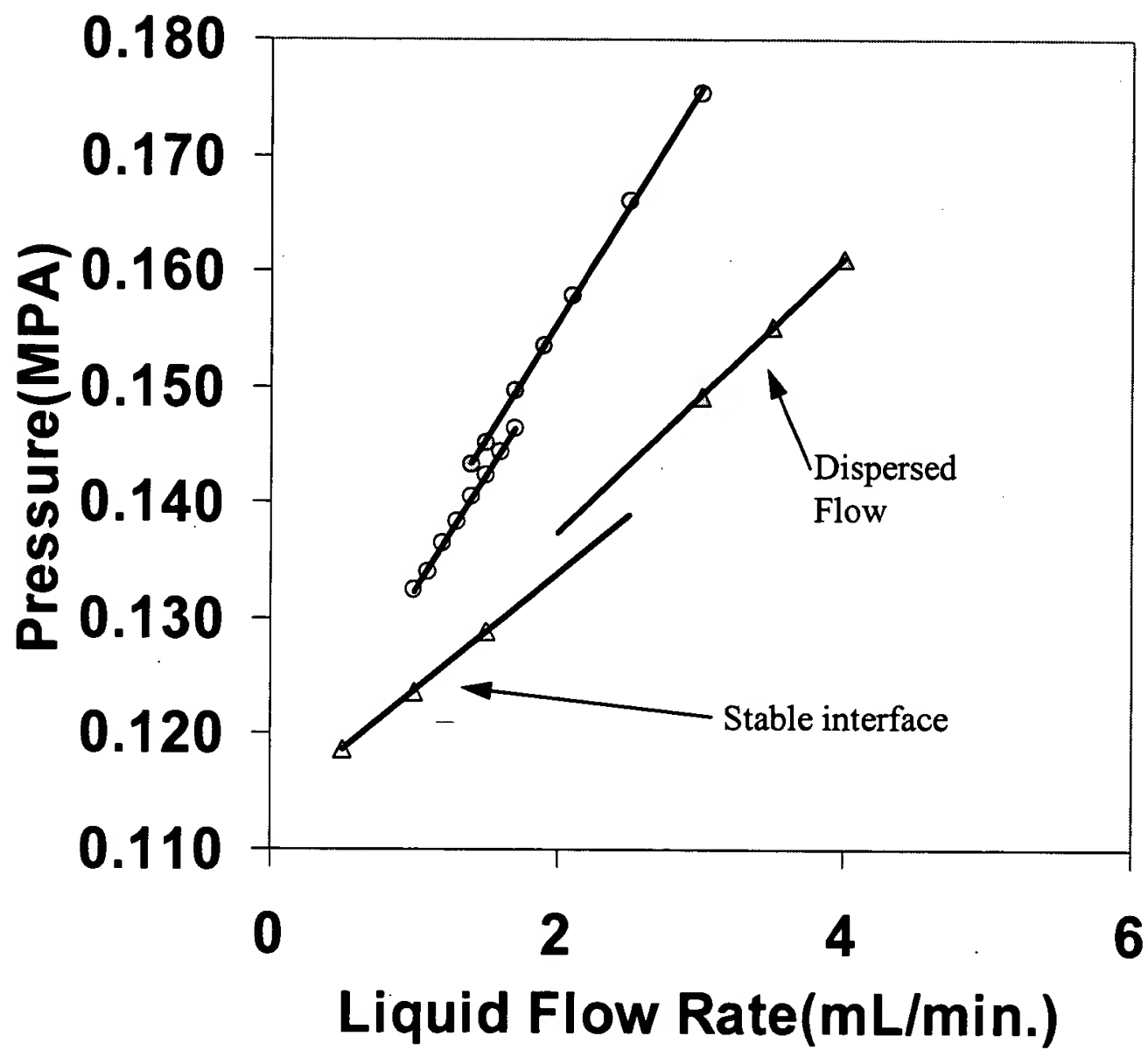


FIGURE 25